NON-PUBLIC?: N
ACCESSION #: 9510110009
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Diablo Canyon Unit 1 PAGE: 1 OF 7

DOCKET NUMBER: 05000275

TITLE: Turbine Trip and Reactor Trip Due to Failure of Auto Stop Oil Pilot Valve Seat Material
EVENT DATE: 9/6/95 LER #: 95-009-00 REPORT DATE: 10/4/95

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Donald H. Behnke, Senior Regulatory Services Engineer TELEPHONE: (805) 545-2629

COMPONENT FAILURE DESCRIPTION:
CAUSE: B SYSTEM: JJ COMPONENT: V MANUFACTURER: A499
REPORTABLE NPRDS: N

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On September 6, 1995, at 1555 PDT, with Unit 1 in Mode 1 (Power Operation), at approximately 100 percent power, a turbine trip and subsequent reactor trip occurred due to loss of auto stop oil pressure. Plant operators stabilized the plant in Mode 3 (Hot Standby) in accordance with emergency operating procedures. A four-hour, non-emergency report was made to the NRC in accordance with 10 CFR 50.72(b)(2)(ii) on September 6, 1995, at 1836 PDT.

The cause of the event was vendor substitution of pilot valve seat material in a replacement backup trip solenoid valve in the auto stop oil system.

Corrective actions included replacing the solenoid valve with one having the correct seat material, allowing only inspected valves to be issued

from the warehouse, and placing the defective valve on the restricted equipment list for the plant.

1359S.DOC

END OF ABSTRACT

I. Plant Conditions

Unit 1 was in Mode 1 (Power Operation) at 100 percent power.

II. Description of Problem

A. Summary:

On September 6, 1995, at 1555 PDT, Unit 1 experienced a turbine (TA)(TRB) trip followed by a reactor (AB)(RCT) trip from 100 percent power due to failure of the backup solenoid trip valve (JJ)(V) for the turbine auto stop oil system (JJ), Plant operators stabilized the plant in Mode 3 (Hot Standby) in accordance with emergency operating procedures. A four-hour, non-emergency report was made to the NRC in accordance with 10 CFR 50.72(b)(2)(ii) on September 6, 1995, at 1836 PDT.

B. Background:

The turbine auto stop oil system (fig. 1) provides protective trips for the main turbine. The trips depressurize the auto stop oil system, which depressurizes the electro-hydraulic fluid trip headers to turbine steam supply valves through an interface valve (PCV-23), The trips include low vacuum trip, mechanical overspeed trip, low bearing lube oil pressure trip, thrust bearing wear trip, and several electronic trip signals that activate a trip solenoid (SV-37). A backup solenoid trip valve (SV-171) provides redundancy to SV-37, as well as turbine protection, during on-line testing of the auto stop oil system. SV-171 is an ASCO pilot actuated solenoid valve which was originally supplied with Teflon main and pilot seat material. During the 1980s, ASCO started supplying these valves with cast urethane seats.

C. Event Description:

On January 27, 1995, INPO issued operational event (OE) 7069

(updated by OEs 7073 and 7113) that reported a turbine trip at Indian Point #2 due to failure of the urethane seat in a solenoid valve in the auto stop oil system. PG&E investigated this event and contacted the vendor representative to determine whether Diablo Canyon had been supplied with any of the valves with urethane seats. The vendor representative incorrectly stated none of the valves with urethane seats had been supplied to Diablo Canyon.

On March 17, 1995, PG&E issued instructions to the Diablo Canyon Purchasing Department to restrict acquisition of ASCO valves with urethane seats, and closed out the investigation of OE 7069 on March 21, 1995,

On September 6, 1995, at 1555 PDT, Unit 1 experienced a turbine trip followed by a reactor trip from 100 percent power due to failure of the backup solenoid valve for the turbine auto stop oil system. Plant operators stabilized the plant in Mode 3 (Hot Standby) in accordance with emergency operating procedures. A four-hour, non-emergency report was made to the NRC in accordance with 10 CFR 50.72(b)(2)(ii) on September 6, 1995, at 1836 PDT.

On September 8, 1995, following replacement of the solenoid valve, Unit 1 was restarted and paralleled to the grid.

On September 13, 1995, PG&E issued a report on the INPO Network (OE 7459) on the Unit 1 trip and its cause. PG&E also transmitted the report to its vendor representative for ASCO valves.

D. Inoperable Structures, Components, or Systems that Contributed to the Event

None.

E. Dates and Approximate Times for Major Occurrences:

1. September 6, 1995, at 1555 PDT: Event/discovery date.
Unit 1 turbine trip and
reactor trip on loss of
auto stop oil pressure.

2. September 6,1995, at 1836 PDT: A four-hour, non-

emergency report was
made to the NRC in
accordance with 10 CFR
50.72(b)(2)(ii).

F. Other Systems or Secondary Functions Affected:

None.

1359S.DOC

G. Method of Discovery:

The event was immediately apparent to plant operators due to alarms and indications received in the control room.

H. Operator Actions:

Plant operators stabilized the plant in Mode 3 in accordance with Emergency Operating Procedures (EOPs) E-0, "Reactor Trip or Safety Injection," and E-0.1, "Reactor Trip Recovery,"

I. Safety System Responses:

1. The reactor trip breakers (AA)(BKR) opened.

2. The main turbine (TA)(TRB) tripped.

3. The control rod drive mechanism (AA)(DRIV) allowed the control rods to drop into the core.

4. The motor-driven and turbine-driven auxiliary feedwater pumps (BA)(P) started.

5. Diesel generator 1-1 (EK)(DG), due to light bus loading conditions, started on momentary bus under voltage; but by design did not close onto its 4 kV bus since startup power was available.

6. By design, all five containment fan cooler units (CFCUs) started but CFCU 1-3 tripped. The redundant breaker for this CFCU was already under investigation for nuisance trips.

III. Cause of the Problem

A. Immediate Cause:

The turbine tripped on loss of auto stop oil pressure. The reactor tripped due to the turbine trip with reactor power greater than the P-9 power range permissive setpoint of 15 percent power.

B. Root Cause:

An incorrect seat material (urethane) was used in the pilot valve for solenoid valve SV-171. The vendor substituted urethane without notifying distributors or users. The urethane seat appears to have failed due to chemical incompatibility.

IV. Analysis of the Event

A reactor trip due to a turbine trip is a previously analyzed Condition II event described in the Final Safety Analysis Report (FSAR) Update, Section 15.2.7, "Loss of External Electrical Load and/or Turbine Trip." The FSAR Update shows that following a turbine trip/reactor trip, the automatic steam dump system (SB) accommodates the excess steam generation. Reactor coolant temperatures and pressure do not significantly increase if the steam dump system and pressurizer pressure control system (JD) are functioning properly. Since the steam dump and pressurizer pressure control systems functioned as designed, the health and safety of the public were not adversely affected by this event.

V. Corrective Actions

A. Immediate Corrective Actions:

The plant was stabilized in Mode 3 using EOPs E-0 and E-0.1.

B. Corrective Actions to Prevent Recurrence

1. A search was conducted to identify other valves of this type installed in either unit. None were found in high risk systems.

2. Solenoid valve SV-171 was replaced with a valve having a Teflon seat in the pilot valve.

3. Instructions were previously issued to the Purchasing Department in March 1995 to restrict acquisition of this type of valve.

4. Restrictions were placed on issuing valves of this type from the warehouse until the pilot valve seat material has been verified to be the correct material.

1359S.DOC

VI. Additional Information

A. Failed Components:

ASCO solenoid valves with model numbers 8223 and 8262.

B. Previous LERs on Similar Problems

None.

1359S.DOC

Figure 1 "MAIN UNIT AUTO STOP OIL DIAGRAM" omitted.

Pacific Gas and Electric Company

77 Beale Street, Room 1451 Gregory M. Rueger
P.O. 770000 San Francisco, Senior Vice President
CA 94177 and General Manager
415/973-4684 Nuclear Power
Fax 415/973-2313 Corporation

October 4, 1995

PG&E Letter DCL-95-208

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Docket No. 50-275, OL-DPR-80
Diablo Canyon Unit 1
Licensee Event Report 1-95-009-00
Turbine Trip and Reactor Trip Due to Failure of Auto Stop Oil Pilot Valve Seat Material

Gentlemen:

Pursuant to 10 CFR 50.73(a)(2)(iv), PG&E is submitting the enclosed Licensee Event Report concerning an automatic reactor trip due to a main turbine trip. The main turbine tripped due to failure of the seat material in a solenoid valve pilot valve in the auto stop oil system.

This event has in no way affected the health and safety of the public.

Sincerely,

Gregory M. Rueger

cc: L.J. Callan
Kenneth E. Perkins
James C. Stone
Michael D. Tschiltz
Diablo Distribution
INPO

Enclosure

N0001921

1359S/JER/2246

*** END OF DOCUMENT ***